

Application No.: 10/604,275
Amendment dated: December 21, 2005
Reply to Office Action of July 21, 2005
Attorney Docket No.: 21295.56

This listing of claims will replace all prior versions and listings of claims in this application:

a.) Listing of Claims

1. (Currently Amended) A method for scanning a wafer specimens using an optical imaging system and a scanning stage, comprising the steps of:

- positioning the wafer with a constant thickness on the scanning stage, the wafer having three-dimensional features within a focusing depth of the imaging system;
- calibrating the scanning stage by obtaining and storing height values Z at different calibration positions X , Y of the scanning stage, and thereby generating a height profile of the scanning stage;
- scanning the wafer specimens, and thereby
 - determining a reference height Z_{ref} of the wafer specimen at the beginning of a specimen scan,
 - traveling to wafer specimen points X_p , Y_p using the scanning stage,
 - setting, while traveling to a respective wafer specimen point X_p , Y_p , a wafer specimen height position Z_p pertinent to the respective wafer specimen point X_p , Y_p , the wafer specimen height position Z_p being determined from the reference height Z_{ref} and the height profile of the scanning stage, and
 - acquiring an image and/or performing a measurement at the respective wafer specimen point X_p , Y_p .

2.(Currently Amended) The method as defined in Claim 1, wherein images of the wafer specimen are acquired by means of a camera, and/or measurements on the wafer specimen being made by means of an optical measurement device, at the wafer specimen points X_p , Y_p .

3.(Currently Amended) The method as defined in Claim 1, wherein the reference height Z_{ref} of the wafer specimen is identified at the beginning of the wafer

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~~specimen~~ scan by focusing with a focusing system at a reference location X_{ref} , Y_{ref} of the wafer specimen.

- 4.(Original) The method as defined in Claim 1, wherein upon calibration of the scanning stage, the height values Z are obtained by focusing with a focusing system.
- 5.(Currently Amended) The method as defined in Claim ~~claim~~ 1, wherein during the wafer specimen scan, the image is acquired and/or the measurement is made without stopping the scanning stage at the respective wafer specimen point X_p , Y_p .
- 6.(Currently Amended) The method as defined in Claim 1 ~~one of the foregoing claims~~, wherein with wafer specimen points X_p , Y_p arranged line-by-line, the wafer specimen points X_p , Y_p are scanned in meander fashion.
- 7.(Original) The method as defined in ~~claim~~ Claim 1, wherein the height values Z identified at the calibration positions X , Y are stored in a lookup table.
- 8.(Currently Amended) The method as defined in Claim ~~claim~~ 1, wherein the wafer specimen height positions Z_p at the wafer specimen points X_p , Y_p are determined, by interpolation or mathematical approximation functions, from the height profile of the scanning stage.
- 9.(Currently Amended) The method as defined in Claim 7, wherein if the calibration positions X , Y and the wafer specimen points X_p , Y_p are coincident, the wafer specimen height position Z_p is determined from the corresponding height value Z from the lookup table, and the reference height Z_{ref} .
- 10.(Currently amended) The method as defined in Claim ~~claim~~ 1, wherein for calibration of the scanning stage, a flat substrate is placed onto the scanning stage.

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11. (Currently Amended) The method as defined in Claim ~~claim~~ 1, wherein the optical imaging system is a microscope.
12. (Currently Amended) The method as defined in Claim ~~claim~~ 1, wherein the optical imaging system is a macroscope.
13. (Currently Amended) The method as defined in Claim ~~claim~~ 3, wherein the focusing system is an LED or laser autofocus system.
14. (Currently Amended) The method as defined in Claim ~~claim~~ 2, wherein an image field of the camera and the spacings of the wafer specimen points X_p , Y_p are selected in such that an image of the entire wafer specimen results when the images of all the wafer specimen points X_p , Y_p are juxtaposed.
15. (Currently Amended) An apparatus for scanning a wafer specimen using an optical imaging system and a scanning stage, comprising comprises:
- a control unit for displacing the scanning stage, to at least one calibration position X , Y during a calibration of the scanning stage in order to obtain a height profile of the scanning stage; and for displacing to specimen at least one wafer specimen point X_p , Y_p during scanning of the wafer of a constant thickness, the wafer having three-dimensional features within a focusing depth of the imaging system specimen; and for setting a wafer specimen height position Z_p at each wafer specimen point X_p , Y_p ;
 - a memory for storing the height profile of the scanning stage;
 - a computation unit for determining the wafer specimen height position Z_p at the respective wafer specimen points X_p , Y_p from a reference height Z_{ref} of the wafer specimen and from the height profile of the scanning stage; and
 - an optical device for acquiring data at each wafer specimen point X_p , Y_p .
16. (Currently Amended) The apparatus as defined in Claim 15, wherein the optical device is a camera for acquiring images at each wafer specimen point X_p , Y_p .

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17. (Currently Amended) The apparatus as defined in Claim 15, wherein the optical device is an optical measurement device for performing a measurement at respective wafer specimen points X_p , Y_p .
18. (Original) The apparatus as defined in Claim 15, wherein a focusing system is provided at least for focusing onto at least one reference location X_{ref} , Y_{ref} in order to obtain a reference height value Z_{ref} .
19. (Currently Amended) The apparatus as defined in ~~one of~~ Claim 15, wherein the optical imaging system is a microscope.
20. (Currently Amended) The apparatus as defined in ~~one of~~ Claim 15, wherein the optical imaging system is a macroscope.
21. (Original) The apparatus as defined in Claim 17, wherein the measurement device is an optical spectrometer, an ellipsometer, or a layer thickness measurement system.